

REMARKS

This is intended as a full and complete response to the Office Action dated March 16, 1999.

Claim 7 stands rejected under 35 USC §112, second paragraph, as being indefinite. Claim 7 has been amended to replace the term "porous, electrically conducting member" with the term "sheet". Reconsideration is requested.

Claims 7, 8, 13-15, 30 and 39 stand rejected under 35 USC §102(b) as being anticipated by Rao et al (Rao). Rao discloses a lead-acid battery using a multi-layer metallic substrate as a bipolar plate. (See Rao, Abstract). In particular, the Examiner has cited that portion of Rao, found at column 6, lines 43-61, which discloses a conductive metal substrate having desirable mechanical strength and enhanced paste adhesion achieved by utilizing a lead or lead alloy fiber or mesh composite. Glass fibers can be partially embedded on only one or on both sides of the lead or lead alloy fiber or mesh composite. The glass fiber mat provides the requisite strength and rigidity in combination with the lead or lead alloy fiber or mesh composite, and the non-embedded part of the mat enhances bonding upon pasting of the active material onto the surface of the composite having the non-embedded part of the mat.

Independent claim 7, from which claims 8, 13-15 and 39 depend, includes a bipolar plate having: (a) a porous, electrically conducting sheet; (b) a gas impermeable material disposed within a minor portion of the sheet to form a gas barrier; and (c) a flowfield formed in the porous, electrically conducting member. Rao's disclosure is limited to lead-acid batteries and is not concerned with having a gas impermeable material. In fact, the lead or lead alloy fiber or mesh composite disclosed in column 6, lines 43-61 would not appear to be gas impermeable. There is nothing disclosed in Rao that would suggest the use of a gas impermeable material and there is no apparent reason why a lead-acid battery would benefit from a gas impermeable material since lead-acid

batteries do not utilize reactant gases at either electrode.

Furthermore, Rao's disclosure is not concerned with flowfields. Rather, Rao teaches that the glass fiber mat is used for the dual purposes of increasing the mechanical strength of the conducting substrate and enhancing paste adhesion thereto. (See Rao, column 6, lines 53-57). The active material paste used on one or both sides of the bipolar plate experiences enhanced adhesion by pasting it into the glass fiber. Since the glass fiber is to be filled with paste, the pasted glass fiber does not form a similar structure nor perform a similar function as that of a flowfield. In fact, even if the paste did not fill the glass fiber, the glass fiber would not act as a flowfield since a lead-acid battery is soaked in an electrolyte solution rather than having fluids, such as reactant gases or liquids, circulating to or from the electrodes. Therefore, Applicant asserts that the rejection is no longer proper. Reconsideration of the claims is requested.

Independent claim 30 includes a bipolar plate having: (a) a porous, electrically conducting sheet; and (b) a gas impermeable material disposed within a minor portion of the sheet to form a gas barrier. As set out above, Rao does not teach, show or suggest the use of a gas impermeable material. Reconsideration and withdrawal of the rejection is requested.


In addition, Applicant asserts that Rao is non-analogous art because it does not address the problem to which the claimed invention is directed and thus, even if considered, would not suggest the invention to one skilled in the art. *Caster v. U.S.*, 9 U.S.P.Q.2d 1753 (Cls. Ct. 1988). Namely, the claimed invention is directed to the problem of providing a light weight bipolar plate that supports high current densities, maintains a gas impermeable barrier between the electrodes and provides a flowfield for the introduction and/or withdrawal of fluid to or from an electrode. (See the specification, page 3, lines 13-18; page 6, line 18 through page 7, line 10; etc.)

New claims 42, 43 and 44 have been submitted for consideration. Claims 42 and 43 state that the flowfield is a gas flowfield and a liquid flowfield, respectively, as supported by the specification at page 10, lines 15-17. Claim 44 is similar in scope to claim 7, but describes in a different manner that the flowfield is that portion of the sheet that is not taken up by the gas impermeable material disposed therein, as support by the specification at page 7, lines 8-9.

CONCLUSION

The foregoing remarks and amendments place the claims in condition for allowance. Applicant requests reconsideration of the claims in light of the above remarks and amendments. Applicant authorizes the Examiner to charge any additional fees that may be due to the deposit account 50-0714/Lynn/0020.

Respectfully submitted,



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